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rescue the text from the corruption into which it had been plunged by the ignorance of typesetters, the indifference of proofreaders, and the incompetence of editors." Since the beginning of the nineteenth century those methods have been in the possession of specialists; and of their application of them every reader of a school edition now enjoys the fruits. If a pupil wants to know about any of these questions, his teacher ought to be able to tell him; if his teacher cannot tell him, this book will enable him to.

GEORGE H. BROWNE

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Principles of Botany. By JOSEPH Y. BERGEN and BRADLEY M. DAVIS. Boston: Ginn & Co.

This book comes to us as a revision and enlargement of Professor Bergen's *Foundations of Botany*—a change amply justified by the result, provided that the aim was to write the old book up into the class of college textbooks of botany.

The volume is made up of three parts: Part I, "The Structure and Physiology of Seed-Plants;" Part II, "The Morphology, Evolution and Classification of Plants;" Part III, "Ecology and Economic Botany." Of these, Parts I and III are by Professor Bergen, and Part II by Dr. Davis.

Professor Bergen's contribution is essentially *The Foundations of Botany* minus the directions for experiments, the chapters on cryptogams and the flora. It is very noticeable, however, that the author has made a careful revision of the old text. More or less scattered paragraphs have been brought into correlation, as in chap. 5, "The Properties of the Cell;" bits of new matter have been added here and there, as in chap. 2, the discussion of ferments and enzymes; topics have been elaborated and recast into more technical form, as the discussions of photosynthesis, adaptation, variation, and mutation. Chaps. 40 and 41, "Hybridization," "Plant Breeding and Economic Botany," are new and valuable additions, and bring the book into touch with the very practical side of botanical science as exemplified by the work of Luther Burbank and the agricultural experiment stations.

The topics protoplasm and classification have been turned over to Dr. Davis for treatment in Part II.

The whole revision has been toward greater precision and succinctness of statement, and has resulted in a more scholarly work.

Notwithstanding the addition of considerable new matter, the boiling-down process has kept the amount of text just the same as in the old book, while an addition of four lines to the length of the page makes the new text appear to be thirty-six pages shorter than the old.

The most conspicuous feature of the new book is the treatment of Part II by Dr. Davis. The old chapters on the cryptogams have been entirely rewritten, and much new matter has been added. The subject is here raised to the dignity of a treatise, is handled in a scholarly manner, smacks of the results of recent research, abounds in good type-forms, and is generally clear and accurate in statement.

Dr. Davis introduces his work by a brief statement of the principles of

morphology, classification, and organic evolution. He then enters upon a discussion of the cell as the unit of life and structure.

Following the method of evolution, he traces the development of the plant body through the flagellates, the algae, bryophytes, pteridophytes, and spermatophytes. The thalloid degenerates are gathered for convenience into the series algae, and then their diverse relationships, or lack of relationship, are explained.

Frequent summaries throughout the text treat carefully of the origin and relationship of all the classes, and are as noticeable for what they refrain from saying as for what they say.

The return to the use of the term "chromatophore" is unfortunate and confusing. The idea, clearly given (pp. 205 and 213) that the red and brown pigments in the so-called chromatophores do the work of photosynthesis is not warranted by botanical research; therefore, to make color the basis of the notion is to take a step backward and revert to Murray's chlorophore, phaeophore, and erythrophore.

The author illustrates the resulting confusion by referring to the "chloroplastids of *Funaria*" (p. 161, Fig. 169), and the "chromatophores of a moss" (p. 165, Fig. 169).

While the author's English is of a high order throughout, his reference to "sealed *tinned* foods" and "the *canning* industry" is likely to cause a smile.

Aside from the summaries already referred to, special commendation is due the treatment of the topics: fermentation, gametophytes of lycopodium and selaginella, double fertilization and xenia, and the frequent footnotes referring to economic publications of the Department of Agriculture. The cuts are generally excellent, a few, notably 198, 221*B*, 237, 241, 253*B*, are poorly drawn. It is a pleasure, however, to see so many original ones.

As a whole, the book forms an excellent treatise on the elements of botany. Its completeness, technical treatment and absence of all laboratory work—even though that be supplied in the form of a separate manual—remove it from the class of high- and normal-school texts and place it clearly in the class of college books.

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Animal Micrology: Practical Exercises in Microscopical Methods. By MICHAEL F. GUYER. Chicago: University of Chicago Press, 1906. Pp. 340, numerous illustrations of apparatus. \$1.75.

The topics discussed in this book are as follows: necessary apparatus; preparation of reagents; general statement of methods; killing, fixing, imbedding, sectioning, staining, and mounting; minute dissections; tooth, bone, and other hard objects; injection of blood and lymph vessels; *in toto* preparations; blood; bacteria; embryological methods with chick, etc.; and reconstruction from sections. There are five appendices (95 pages) with the following titles: "The Microscope and Its Optical Principles;" "Some Standard Reagents and Their Uses;" "Table of Tissues and Organs with Methods of Preparation;" "Preparation of Microscopic Material for a Course in General Zoology;" "Table of Equivalent Weights and Measures."